

Model

The model we use for ExpressNet is a combination of "electronic Fed-X" and e-mail. Like with Fed-X, media is packaged, labeled and dropped off for shipment. These packages and their delivery status are well tracked and billed to an account. However, like e-mail, clients automatically and periodically call into a local or central delivery server to fetch their deliveries. This is called a "pull model" because the client decides, based upon what it needs but does not yet have, what material to actively fetch. There is a mechanism for the delivery server to notify clients that they need to call in, but the client always initiates the call-in and fetch.

We use e-mail as a generic messaging transport because of its reliability and its passive access. Specifically, the server just needs to submit its information to its outbox, and the e-mail system will let it flow through the network to the client's inbox. Still, e-mail lacks the bandwidth to handle large, binary media files. Thus, we use FTP and satellite delivery to distribute the package contents. A summary the terrestrial delivery model is: Packing lists are e-mailed to the clients, while package contents are fetched by the client using FTP.

Data Flow Overview

There are three types of data flowing through the system: packages, confirmations, and address-books. There are three methods of transport: e-mail, File-Transfer-Protocol (FTP), and File-Broadcast-Protocol (FBP).

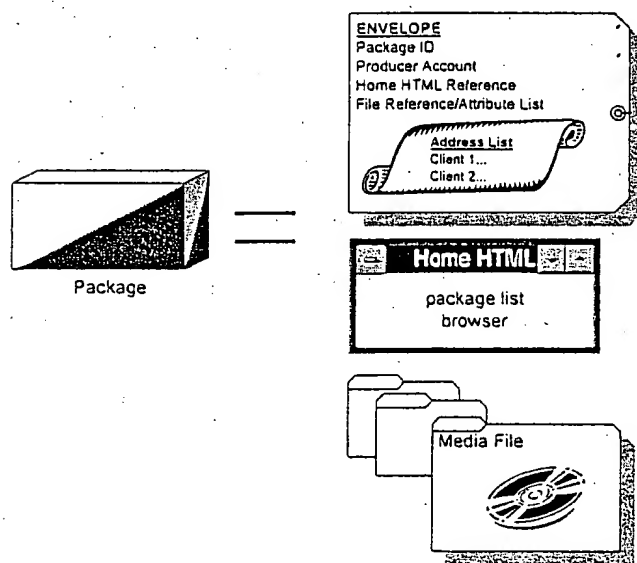


Figure 2 - Package Content

Envelope

Of the data flowing through the system, a package is a high level abstraction for the producer and the client. To the delivery system, a package is an association of an envelope and the files referenced in that envelope. An envelope is an ASCII formatted text-file containing, among other things, identification, a file list, and an address list. Envelopes are small package headers that are replicated and delivered through the network through e-mail (SMTP and POP3 protocols). When a client receives an envelope, it checks the file list contained therein and downloads over ISDN all files it does not yet have. The client uses FTP to achieve this download. Where there is a satellite component, the server will broadcast out the files and envelopes, too. This way, a client can process and receive envelopes and files over this high-